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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/517,866	09/19/2005	Hirohisa Suwabe	Q76046	2732

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EXAMINER	
GUGLIOTTA, NICOLE T	

ART UNIT	PAPER NUMBER
1794	

MAIL DATE	DELIVERY MODE
12/24/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/517,866	SUWABE ET AL.	
	Examiner	Art Unit	
	NICOLE T. GUGLIOTTA	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 September 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1, 23 - 26, 28 - 53* is/are pending in the application.

4a) Of the above claim(s) *23 - 26* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 28 - 53* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Examiner's Note

1. Examiner acknowledges (a) the amendment to claims 1 and 34, and the addition of new claims 28 - 53 submitted on 8/11/2008, and (b) the amendment to claim 51 in the claims submitted on 9/12/2008.

2. Examiner acknowledges the cancellation of claims 2 – 22 and 27, as well as the withdrawal of claims 23 – 26 from this examination.

3. Examiner appreciates applicant's explanation (Remarks submitted 9/21/2008 and 8/11/2008) to clarify how claims were amended and added.

Claim Rejections - 35 USC § 102

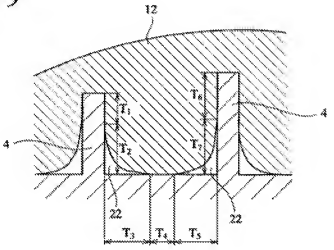
4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 28 – 29, 33, 35, 36, 49 and 51are rejected under 35 U.S.C. 102(b) as being anticipated by JP 63-144836, U. (JP '836) (The Examiner received a verbal translation of JP '863 to confirm the information disclosed for the purpose of this rejection).

6. APPLICANT'S INVENTION

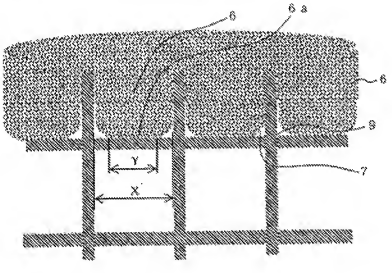
Fig. 9



7.

8. PRIOR ART (JP '836)

[図4(a)]



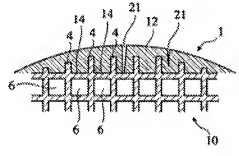
9.

10. In regard to claims 1, 33, 36, JP '836 disclose (Figure 4(a) shown above) a ceramic honeycomb structure comprising grooves (6a) on its periphery and cell walls, a peripheral wall (6) covering said grooves (6a), wherein there are stress release portions (gaps, 7), at least partially between said peripheral wall layer and said grooves. These

stress release portions (gaps, 7) retain heat and improve thermal conductivity (Sections [0018] and [0019]). The peripheral wall is formed by a slurry coating. The viscosity of this slurry may be adjusted to prevent the slurry from contacting the corner section (9) to form gap (7) (Section [0032]).

11. APPLICANT'S INVENTION

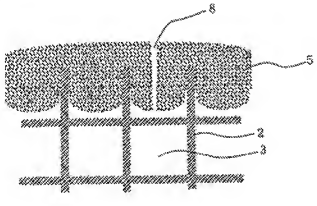
Fig. 5



12.

13. PRIOR ART (JP '836)

[図3(b)]



14.

15. In regard to claims 28, 29, 31, and 32, JP '836 further discloses stress release portions (voids, 8), which correspond to applicant's "voids/stress release portions in the peripheral wall" (21, Figure 5), in Figure 3(b) shown above. Examiner takes the position "crack" and "slit" are analogous.

16. In regard to claim 35, JP '836 disclose a contact ratio (Y/X) of 0.7 (70%) (Section [0019]). Y and X are illustrated in Figure 4(a) of JP '836.

17. In regard to claims 49 and 50, JP '836 disclose exhaust gasses (particulate) are filtered using the honeycomb structure of their invention (Section [0002]).

Claim Rejections - 35 USC § 103

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

19. Claims 30, 34, 43, 37 – 48, 52, 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP '836, in view of Kotani et al.

20. In regard to claim 30, JP '863 is silent in regard to the length of the voids.

21. Figure 1 of Kotani et al. disclose a crack/void (10) (left side of honeycomb structure), which is the full length of said ceramic honeycomb structure.

22. It would have been obvious to one of ordinary skill in the art at the time of the invention to allow the cracks to extend down the length of the entire honeycomb structure in order to provide improved heat and thermal shock resistance throughout the entire length of the honeycomb structure.

23. In regard to claims 34, 37, 41, JP '863 and Kotani et al. are silent in regard to the percentage of grooves having voids.

24. It would have been obvious to one of ordinary skill in the art at the time of the invention that the optimum percentage of grooves having voids, slits, or cracks (relative to the total amount of grooves) is a result effective variable, which can be experimentally determined. The scope of the inventions of JP '863 and Kotani et al. are not limited by the number of cracks or voids in the peripheral wall or between the peripheral wall and the honeycomb grooves.

25. In regard to claims 38, 44, and 52, JP '836 is silent in regard to the amount of colloidal (amorphous) silica, the thermal expansion coefficient of the silica used, and the amount of amorphous oxide matrix (colloidal silica and colloidal alumina) in the peripheral wall (coating).

26. Kotani et al. also disclose

> The cordierite particles may be wholly or partially replaced by ceramic fibers formed of...amorphous silica alumina, for example (Col. 7, Lines 45 – 47)...When the colloidal oxides, such as colloidal silica or colloidal alumina, are used as the inorganic binder, the outer coating preferably contains 3 – 35 parts by weight of the solid portion of the colloidal oxides per 100 parts by weight of the cordierite particles and/or ceramic fibers (Col. 7, Line 66 - Col. 8, Line 3).

27. In regard to applicant's limitation for the coefficient of thermal expansion of amorphous silica, Kotani et al. disclose

> the lower thermal expansion of the outer coating is preferred for effectively preventing cracks and other defects in the outer coating (outer wall) due to the thermal stresses. To reduce the thermal expansion of the outer coating, it is effective to reduce the thermal

expansion of the aggregate, to be lower than that of a matrix provided by the inorganic binder having a relatively high coefficient of thermal expansion (Col. 7, Lines 26 – 32).

28. Examiner notes the coefficient of thermal expansion of amorphous silica-alumina is 44 x 10^{-7}/°C. It would have been obvious to one of ordinary skill in the art at the time of the invention to reduce the coefficient of thermal expansion as much as possible, as Kotani et al. teaches, in order to reduce cracks and make the resultant honeycomb structure highly resistant to cracks. Amorphous silica (10 x 10^{-7}/°C has a lower coefficient of thermal expansion than amorphous alumina-silica (44 x 10^{-7}/°C). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute amorphous silica-alumina with amorphous silica. It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the concentration ranges disclosed by Kotani et al. in the invention of JP '836 because Kotani et al. demonstrate these ranges yield a honeycomb with high thermal shock resistance.

29. Kotani et al. discloses the same amount of amorphous silica-alumina (amorphous aggregate), as well as the same amount of amorphous oxides (colloidal silica and colloidal alumina binder) as applicants. Therefore, Examiner places the burden upon the applicant to show there is a patentable difference between the use of amorphous silica and amorphous silica alumina in a paste for the manufacture of a honeycomb particulate filter.

30. In regard to claims 39, 40, 45, JP '836 disclose (Figure 4(a) shown above) a ceramic honeycomb structure comprising grooves (6a) on its periphery and cell walls, a

peripheral wall (6) covering said grooves (6a), wherein there are stress release portions (gaps, 7), at least partially between said peripheral wall layer and said grooves. These stress release portions (gaps, 7) retain heat and improve thermal conductivity (Sections [0018] and [0019]).

31. In regard to claim 42, JP '836 disclose a contact ratio (Y/X) of 0.7 (70%) (Section [0019]). Y and X are illustrated in Figure 4(a) of JP '836.

32. In regard to claims 43 and 47, JP '836 discloses a honeycomb body comprising axial grooves on its periphery and cell walls constituting a larger number of flow paths constituting a large number of flow paths inside said grooves, and a peripheral wall (coating) covering said grooves. In addition JP '836 discloses baking the honeycomb structure before removing the peripheral wall. However, JP '836 is silent in regard to the possibility of baking (firing) the honeycomb after the peripheral wall is removed.

33. Kotani et al. discloses that firing of the honeycomb may occur when the coating is fired (Col. 8, Lines 31 – 36). Since the coating is applied after the peripheral wall is removed, Kotani clearly discloses the peripheral wall is removed before firing of the honeycomb.

34. It would have been obvious to one of ordinary skill in the art at the time of the invention to fire the honeycomb of JP '836 after removing the peripheral wall rather than before because Kotani et al. demonstrate this rearrangement of steps produces a

honeycomb structure of higher isostatic strength and therefore higher mechanical strength.

35. In regard to claim 46, JP '836 further discloses stress release portions (voids, 8), which correspond to applicant's "voids/stress release portions in the peripheral wall" (21, Figure 5), in Figure 3(b) shown above. Examiner takes the position the terms "crack" and "slit" are analogous.

36. In regard to claim 48, JP '836 is silent in regard to isostatic strength.

37. Kotani et al. disclose isostatic strength of as much as 40 Kg/cm^2 (Table 3, Coating No. 5, with grooves). This is equivalent to 3.923 MPa. Kotani et al. credit this improved isostatic strength to the presence of the outer coating on the periphery of the honeycomb body (Col. 6, Lines 25 – 30).

38. It would have been obvious to one of ordinary skill in the art at the time of the invention that the presence of an outer coating which replaces a removed peripheral wall improves the isostatic strength of the outer wall, resulting in a higher strength honeycomb structure.

39. In regard to claim 53, Examiner directs applicant to the argument made for claim 52, with the exception of the limitation of the particle size of amorphous silica and its aspect ratio.

40. Kotani et al. disclose a particle size of 10 μm for the amorphous silica alumina (Table 1), but Kotani disclose the ceramic fiber length is 10 -15 microns with a diameter of 2 – 3 microns (Col. 7, Lines 50 – 51). This is an aspect ratio of 5. Such sizes allows for close packing and therefore enabling the outer coating to effectively function as a reinforcing wall for the honeycomb body (Col. 16, Lines 1 - 3).

41. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of JP '835 with an aggregate ceramic fiber having an aspect ratio of approximately 5, as disclosed by Kotani et al., because this property contributes to reinforcing the honeycomb structure and therefore attaining a high strength structure.

42. Claim 51 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP '836, in view of Kotani et al., and further in view of Horikawa.

43. In regard to claim 51, JP '836 and Kotani et al. are both silent in regard to porosity and pore size.

44. Horikawa et al., like JP '836 and Kotani et al., also disclose a honeycomb structure in which the peripheral wall is removed and a coating material is deposited in place of the peripheral wall. In addition, Horikawa et al. add a pore forming agent to the slurry, for example graphite, starch powder and sawdust (Col. 3, Liens 13 – 16).

45. It would have been obvious to one of ordinary skill in the art at the time of the invention to add a pore forming agent to make a porous honeycomb structure, as it was

common in the art at the time of the invention. The porosity and average pore size of the honeycomb structure is dependent upon the type and amount of pore forming agent, and is therefore a result effective variable that can be determined experimentally.

Response to Arguments

46. Rejection over Kotani

47. Applicant argues "One distinguishing feature of amended claim 1 is that the stress release portions are voids provided at least partially between the peripheral wall layer and the grooves, a feature which is different from and not suggested by Kotani" (Remarks, Page 16).

48. Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

49. Applicant argues "Major distinguishing features of claim 38 are: (1) the thermal expansion coefficient of the peripheral wall layer (not in a radial direction) is smaller than that of the cell walls in a radial direction, where (2) the peripheral wall layer has a composition comprising 100 parts by mass of amorphous silica and 2 to 35 parts by mass of an amorphous oxide matrix and (3) the amorphous silica has a thermal expansion coefficient of 10.0×10^{-7}/°C or less...Kotani does not teach or suggest distinguishing features (1) to (3) of the claim 38 as above discussed" (Remarks, Page 17).

50. Applicant's arguments with respect to claim 38 have been considered but are moot in view of the new ground(s) of rejection.

51. Applicant argues "Distinguishing features of claim 52 are that in the peripheral wall made of a mixture comprising amorphous silica particles and an amorphous oxide matrix, (1) the amorphous oxide matrix is formed from colloidal silica and/or colloidal alumina, (2) the peripheral wall layer has a composition comprising 100 parts by mass of amorphous silica and 2 to 35 parts by mass of an amorphous oxide matrix, and (3) the amorphous silica has a thermal expansion coefficient of 10.0×10^{-7}/°C or less...The distinguishing features of claim 52 are different than those disclosed by Kotani" (Remarks, Pages 18 – 19).

52. Applicant's arguments with respect to claim 52 have been considered but are moot in view of the new ground(s) of rejection.

53. Applicant argues "Major distinguishing features of claim 53 (amended old claim 27) reside in the coating material comprising 100 parts by mass of amorphous silica and 2 to 35 parts by mass (on a solid basis) of colloidal silica and/or colloidal alumina, and the amorphous silica particles have a thermal expansion coefficient of 10.0×10^{-7}/°C or less, an average particle size of 1 to 100 μm and an aspect ratio of 10 or less. Kotani is silent in regard to such limits" (Remarks, Page 20).

54. Applicant's arguments with respect to claim 53 have been considered but are moot in view of the new ground(s) of rejection.

55. Applicant argues "the subject matter of claim 34 (amended old claim 7) calls for the number of grooves having said voids between the peripheral wall layer and the number of grooves is 5% or more of the total number of the grooves in the ceramic honeycomb structure, where the stress release portions are voids provided between the peripheral wall layer and the grooves. Kotani is silent regarding such limits" (Remarks, Page 20).

56. Applicant's arguments in regard to the number of grooves having voids have been fully considered but they are not persuasive. It would have been obvious to one of ordinary skill in the art at the time of the invention that the optimum percentage of grooves having voids, slits, or cracks (relative to the total amount of grooves) is a result effective variable, which can be experimentally determined. The scope of the inventions of JP '863 and Kotani et al. are not limited by the number of cracks or voids in the peripheral wall or between the peripheral wall and the honeycomb grooves.

57. Applicant argues "The features of claim 34 and claim 41 make it possible to provide ceramic honeycomb structures having voids between the peripheral wall layer and the grooves, which are excellent both in isostatic strength and thermal shock resistance temperature. This is because even though cracking occurs due to thermal shock resistance temperature. This is because even though cracking occurs due to thermal shock stress in the peripheral wall layer 12, the cracking will not propagate into the cell walls 4 because the voids 22 release thermal shock stress from the ceramic

honeycomb structure…Kotani is silent on such aspects of the invention" (Remarks, Page 21).

58. Applicant's arguments with respect to claims 34 and 41 have been considered but are moot in view of the new ground(s) of rejection.

59. Rejection over Kotani in view of Horikawa

60. Applicant argues "In the invention of claim 43, a major distinguishing feature lies in removing a peripheral wall and nearby cell walls before firing…Applicants wish to emphasize that (as shown in Example 22 in Table 7), the honeycomb structure formed by removing a peripheral wall and nearby cell walls after firing is poor in Isostatic Strength (page 46, Line 8 to page 47, line 3 (Example 32) and Example 32 in Table 7 at page 49 of the specification)…Accordingly, the technical feature of claim 43 directed to a ceramic honeycomb body obtained by removing a peripheral wall and before firing is essential, and both Kotani and Horikawa are silent on this aspect of the present invention" (Remarks, Pages 22 - 23).

61. Applicant's arguments in regard to claim 43 have been fully considered but they are not persuasive. Kotani discloses that firing of the honeycomb may occur when the coating is fired (Col. 8, Lines 31 – 36). Since the coating is applied after the peripheral wall is removed, Kotani clearly discloses the peripheral wall is removed before firing of the honeycomb. In addition, Kotani discloses a honeycomb structure with an isostatic strength as high as 3.9 MPa (see arguments above).

62. Applicant argues "Claim 47 thus defines that the peripheral wall layer is formed before or after the firing the ceramic honeycomb body in the ceramic honeycomb structure of amended claim 1...and that Horikawa does not teach or suggest any ceramic honeycomb structure having stress release portions provided between the peripheral wall layer and the grooves as claimed in claim 1" (Remarks, Page 23).

63. Applicant's arguments with respect to claim 47 have been considered but are moot in view of the new ground(s) of rejection.

64. Applicant argues "Based on the distinguishing features of the ceramic honeycomb structures of the present discussed above, the specification of the present application describes at page 8 that: 'In the preferred embodiment of the present invention, the ceramic honeycomb structure has an isostatic strength of 1.5 MPa or more. The cell walls of the ceramic honeycomb structure have a porosity of 50 – 80% and an average pore size of 10 – 50 μm'...Both Kotani and Horikawa are silent on such aspects of the present invention" (Remarks, Page 25).

65. Applicant's arguments in regard to the pore size and porosity of the coating/peripheral wall have been fully considered but they are not persuasive. Kotani et al. disclose a honeycomb structure with isostatic strength of as much as 3.9 MPa (see arguments above). In addition, Horikawa et al. disclose the presence of pore forming agent, as well as various pore forming agents that can be used. The porosity and average pore size of the honeycomb structure are dependent upon the type and amount

of pore forming agent used, and is therefore a result effective variable that can be determined experimentally.

It is noted that applicant amended claim 1 to remove "and/or" with regard to the stress release portions being either partially in the peripheral wall layer and/or between the peripheral wall layer. The claims now require the portions to be present at least partially between the wall layer and the grooves which necessitated a new search and ground of rejection above.

Conclusion

66. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NICOLE T. GUGLIOTTA whose telephone number is (571)270-1552. The examiner can normally be reached on M - Th 8:30 - 6 p.m., & every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on 571-272-1284. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

NICOLE T. GUGLIOTTA
Examiner
Art Unit 1794

/Jennifer McNeil/
Supervisory Patent Examiner, Art Unit 1794